

Task Order 11-10

1. Title of Effort: Shuttle Support

2. Task Description:

The contractor shall provide engineering and analytical expertise to the Space Shuttle Program for the development of reliability, maintainability, and supportability analysis, flight operations, and Orbiter Systems integration, and mission support.

2.1 SOW Reference: Section C, Subsections 5.0, and 6.0

2.2 Requirements

2.2.1 System Safety & Reliability:

2.2.1.1 S&MA Program Processes

Provide technical and administrative support to program level boards, panels, and processes.

1. Review contractor-provided risk assessments and identify increases in risk.
2. Perform qualitative and/or quantitative safety and mission assurance risk assessments.
3. Coordinate/resolve changes/issues dealing with Program S&MA requirements.
4. Maintain Folios infobases. (HR, CIL, LCC, OMRS, Flight Rules Annex, PRACA)

2.2.1.2 Safety Engineering Review Panel (SERP) Engineering & Integration

Provide safety engineering and integration expertise to both the JSC Safety Engineering Review Panel (JSERP) and Integrated Safety Engineering Review Panel (ISERP).

- a. Assess Hazard Reports for technical accuracy and requirement compliance.
- b. Perform back-up duties to the Safety Panel Representatives from MX/SSP S&MA Program Office and NA/S&MA Directorate as required.
- c. Perform Integrated Safety Assessments.
- d. Provide Orbiter Systems technical support as required.

2.2.1.3 Flight Operations System Safety Activity

Perform ascent, orbit and entry qualitative and/or quantitative operational risk assessments

- a. Perform/provide qualitative and/or quantitative risk assessments in support of the following Shuttle program boards and panels: FOICB, FRCB, CPCB, SRP, Flight Techniques Panels and Joint Operations Panel. Change Request (CR) evaluations are provided to the Board representatives for each respective board.
- b. Assess hazards associated with joint Shuttle/ISS operations.
- c. Provide risk assessments and status pertaining to mission activities and/or hardware/software problems in support of the S&MA Mission Management Team representative.

2.2.1.4 Systems Engineering & Integration Safety & Reliability Activity

Provide safety and mission assurance expertise in support of SSP element integration for the following areas: Propulsion, Mechanical/Structural, and Electrical Systems Integration; Ascent, Orbit, Entry Operations Integration; and Software Integration.

- a. Change Evaluation
 1. Perform/provide qualitative and/or quantitative risk assessments on changes to program requirements and element ICD's in support of ICB
 2. Identify impacts to Integration Hazard Reports.

b. Board/Documentation

1. Identify impacts to Integration of changes to element-specific documentation.
2. Identify and recommend program and element document updates as appropriate for integration.
3. Provide S&MA technical support by performing/providing qualitative risk assessments for integration issues for other discipline-specific program baselining.
4. Perform surveillance to assure the integration contractor presents/updates hazard documentation according to Program requirements.

c. Problem Assessment

Assess Integration issues involving the SSP elements to determine impact to flight and provide S&MA position to program flight rationale. Includes but not limited to PRT participation, evaluation of out of family issues for disposition, etc.

d. Verification Assessment

Assure that controls for Integrated Hazards are verified as recorded in risk documentation and reflect Program/Project requirements.

e. New Design

Participate in element and upgrades design reviews; verifying compliance to SSP S&MA requirements, providing technical evaluations associated with SSP element interfaces, identifying issues and generating RIDs to document findings.

f. Launch Preparation

1. Certification of Flight Readiness (CoFR)
2. SMSR
3. SERP Activities (e.g., Review of integrated HR's & mission by mission safety assessments), IFA resolution, and LCC and flight rule changes, GFE CARs.
4. Risk ranking and PRA generation in support of Hazard Report updates.

g. Flight Operations

Provide real-time Mission Evaluation Room S&MA console support to the MMT, IFA identification and resolution, LCC issues and flight operations related panel support (e.g., Aborts/GNC Panel, Range Safety Panel, Intercenter Photo Working Group, Debris Integration Group).

h. Ascent & On-Orbit Imaging:

Provide S&MA engineering technical support to the Intercenter Photo Working Group (IPWG).

1. Provide real time assurance of ascent and on-orbit imagery data.
2. Provide S&MA risk assessment to the Imagery Team and Shuttle S&MA.

i. Flight Software Activity:

1. Perform technical evaluations and qualitative risk assessments on software change requests and discrepancy reports and provide S&MA representation in support of the following boards: SASCB, Reconfiguration DCR Board, and the MEDS Software panel (MSP). Perform technical analysis on verification test plans procedures, and analysis results.
2. Provide technical safety support for the First Article Configuration Inspection (FACI), Configuration Inspection (CI), MEDS Software Acceptance Review (SAR) and the Software Readiness Review (SRR). Perform a mission readiness assessment and prepare a S&MA Flight Readiness Statement in support of the SRR.
3. Perform surveillance of SFOC products and processes including flight readiness, non-conformance resolution, and others as defined by the Flight Software Surveillance Plan.

2.2.1.5 Mission Operations and Integration Activity

Perform S&MA technical risk assessments in support of MO/Operations and Integration.

- a. Work with the Flight Managers to identify, track and resolve safety issues and concerns associated with Orbiter flight hardware and operations.
- b. Participate in and provide S&MA risk assessments for design and program milestone reviews for Cargo Integration Hardware.

2.2.1.6 Orbiter Systems Activity (MV)

a. Orbiter Problem Resolution Teams (PRTs):

Provide safety and mission assurance expertise to the PRTs to include the following:

1. Change Evaluation
2. Problem Reporting and Corrective Action (PRACA)
3. Verification Assessments
4. New Design
5. Quantitative Risk Assessments

b. Remote Manipulator System (RMS) Integration:

Provide S&MA representation for the RMS CCB; perform technical evaluations, and risk assessments of changes; perform integrated assessments of proposed changes to flight rules and crew procedures; provide technical S&MA engineering expertise to design reviews and program reviews.

c. Trending

Generate Orbiter contractor-furnished equipment design center PRACA trending spreadsheets to aid the OPO in monitoring vehicle hardware trends in accordance with the objectives of the Orbiter Aging Working Group.

d. Mission Support

1. Provide S&MA engineering expertise to the assessment of real-time mission risks in support of the S&MA Mission Management Team and the OPO MER manager through implementation of the Shuttle Problem Investigation Team (SPIT) process.
2. Generate CHIT responses as required to identify proposed changes in risk as a result of flight anomalies and associated work-arounds.
3. Develop/provide failure history assessments to the MER manager during Space Shuttle flight anomaly investigations as required.

e. Orbiter Integration

1. Provide inputs to OPO risk management activity.
2. Perform evaluations of S&MA data deliverables in support of hardware development milestone reviews.
3. Perform/provide quantitative/qualitative assessments of selected Orbiter systems and proposed design modifications for comparative purposes with emphasis on (1) increasing levels of safety, (2) mission success, and (3) reliability/maintenance. Coordinate analyses and results with the engineering, vehicle processing, and logistics communities using the appropriate formalized review forums
4. Perform/provide analyses for comparative assessments of different design approaches to baseline configuration.
5. Assessment of Integrated Hazards associated with Orbiter controls.
6. Provide system level technical assessments to the S&MA representatives to the Program.
7. Provide S&MA representation to the Program.

f. JSC Resident Office at KSC

1. Provide engineering support to the JSC Resident Office in dispositioning unexplained anomalies (UA's) and Prime Material Review items by performing risk assessments and quality coding verifications of these specific problems.
2. Identify configuration management (CM) processes/procedures/guidelines and assist JSC RO personnel with the management of MV CM function.
3. Participate in Orbiter Major Modification (OMM) activities to ensure proper adherence to vehicle processing quality requirements.
4. Interface with Logistics and other KSC organizations to identify data sources and provide data for quantitative risk and reliability analyses.

2.2.1.7 Reliability and Maintainability (R&M) Activity:

Provide engineering and analytical expertise to the Space Shuttle Program for the development of reliability, maintainability, and supportability analysis and participation in the SSP R&M Working Group.

- a. Shuttle S&MA R&M Working Group. Provide technical, analytical, and requirements expertise to the R&M Working Group to facilitate the performance of R&M requirements audits, assessment and resolution of R&M issues and Program changes, participation in design reviews, flight readiness reviews, and Program boards and panels to ensure the identification of R&M issues and requirement compliance, and review Prime Contractor analysis to assure technical accuracy, adequacy, and compliance with R&M policy providing corrective action recommendations as appropriate.
- b. Reliability and Maintainability Assessments and Analyses. Perform reliability and maintainability analyses to assess the impact of Shuttle design and operational changes, anomaly resolution and assess system performance with emphasis on: (1) increasing levels of safety, (2) mission success, (3) supportability, and (4) aging vehicle impacts.

3.0 DELIVERABLES

Change Request evaluations and pre-briefs
Bi-monthly customer satisfaction metrics
Special PRACA assessments
Certification assessments
CIL's and Hazard Report Review Results
CoFR assessments and status
Top 10 Risk recommendations - Monthly
R&M assessments and analysis reports

4.0 PERIOD OF PERFORMANCE: October 1, 2009 – September 30, 2010

5.0 ESTIMATED COSTS:

Contractor may provide travel, training, materials, and other non-labor resources as necessary to support task order requirements.